Program Announcement LAB NE-2000-1
Nuclear Energy Research Initiative

Department of Energy
Office of Nuclear Energy, Science and Technology (NE)

Nuclear Energy Research Initiative Program Announcement LAB NE-2000-1

ACTION: The DOE National Laboratories are invited to submit field work proposals (FWP's) for funding under the Nuclear Energy Research Initiative(NERI) program.

SUMMARY: The Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, is interested in receiving field work proposals for innovative scientific and engineering research and development in the field of nuclear energy as part of the Nuclear Energy Research Initiative (NERI). NERI is designed to support innovative research that can address the principal technical and scientific obstacles to future use of nuclear power in the U.S. NERI is also intended to reinvigorate the vital nuclear scientific and engineering infrastructure within U.S. universities, industry and DOE national laboratories.

The NERI program was initiated in Government Fiscal Year 1999, with awards for 46 projects, variously of 1 to 3 years duration. This Program Announcement applies to the "second round" of the program calling for new awards in Fiscal Year 2000.

This Program Announcement applies only to field work proposals from DOE National Laboratories that are the sole or lead performer organization of the proposed work. Where the laboratories are included in collaborative arrangements with other nonfederal organizations, but not as the lead performers, the proposals should be submitted in response to a separate Solicitation, DE-PS03-00SF22016, being issued simultaneously with this Program Announcement.

DATES: Potential proposers are requested to submit a Notice of Intent to Apply (Attachment A). Refer to the paragraph on the Designation of Field(s) of Proposed Work and the listing in Attachment B of this Program Announcement to identify the contemplated field of R&D in Attachment A. The notice should be faxed to Denise Berry, Department of Energy at (510) 637-2025 by December 8, 1999. This Notice of Intent in no way obligates an organization to submit a field work proposal, and failure to submit the Notice of Intent in no way prevents an organization from submitting a field work proposal. However, submittal of this notice will greatly facilitate the proposal review process and selection of reviewers.

The deadline for receipt of the formal field work proposals is February 17, 2000.

ADDRESS: All field work proposals responding to Program Announcement LAB NE-2000-1 should be sent to Denise Berry, U.S. Department of Energy, 1301 Clay Street,

700N, Oakland, California 94612-5208, Attn: Program Announcement LAB NE-2000-1

An original and seven copies of the field work proposal shall be submitted by United States Postal Service including Express Mail, commercial mail delivery service, or hand carried by the proposer to the address stated above. Field work proposals will not be accepted by fax or electronic mail.

ELIGIBILITY: This Program Announcement invites field work proposals from DOE national laboratories acting as the sole or lead performer organization.

AWARDS: It is anticipated that awards will be made in Fiscal Year 2000. Field work proposals will be funded yearly, contingent upon the availability of funds. Up to a total of $3 million of Government Fiscal Year 2000 Federal funds are available for awards under this Program Announcement and the complementary grants and cooperative agreements Solicitation (to universities or other institutions of higher learning, industry, non-profit and R&D organizations, and DOE national laboratories that are not participating as the lead organization). Funding for individual research awards is expected to be in the range of $100,000 to $400,000 per year. Collaborative research projects involving two or more organizations may receive larger awards if merited. The period of performance for individual projects is expected to be up to 3 years.

DOE reserves the right to fund, in whole or in part, any, all, or none of the field work proposals submitted in response to this Program Announcement.

BACKGROUND: In January 1997, the President requested his Committee of Advisors on Science and Technology (PCAST) to review the current national energy research and development (R&D) portfolio, and provide a strategy to insure the U.S. has a program to address the Nation's energy and environmental needs for the next century.

In its November 1997 report responding to this request, the PCAST Energy Research and Development Panel determined that assuring a viable nuclear energy option to help meet our future energy needs is important; and recommended that a properly focused R&D effort should be implemented by the Department of Energy to address the principal obstacles to achieving this option, including issues involving nuclear waste, proliferation, economics, and safety.

In response to these recommendations, the Department initiated the Nuclear Energy Research Initiative (NERI). To assist in developing the work scope topics, a work shop was convened in Washington D.C. on April 23 and 24, 1998, attended by over 120 cognizant researchers, scientists and engineers. Projects were selected for award, using an objective merit-peer review process, based on individual or collaborative applications from universities, DOE national laboratories, industry, R&D organizations, and non-profit organizations. Solicitations for the first round of the NERI program were issued on October 23, 1998, and all applications were received by January 29, 1999. Selections for negotiation of awards were announced on May 11, 1999. Grants and cooperative

agreements, as applicable, were awarded from June 25 to September 9, 1999. A total of 46 projects were awarded.. Abstracts of the selected projects are shown on our NERI web page:

http://neri.ne.doe.gov

Respondents are encouraged to refer to these abstracts to avoid duplication in the preparation of new applications under this Program Announcement, which initiates the second round of the NERI program.

OBJECTIVES The NERI program is intended to conduct R&D to meet the following objectives:

- Address and help overcome the principal technical and scientific obstacles to expanded future use of nuclear energy in the U.S., including the issues involving resistance to proliferation, unfavorable economics and nuclear waste disposition;

- Advance the state of nuclear technology to maintain a competitive position in overseas markets and a future domestic market;

- Promote and maintain a nuclear science and engineering infrastructure to meet future technical challenges, and

- Improve the performance, efficiency, reliability, economics, and other attributes to enhance nuclear energy applications.

SCOPE OF WORK: The Department of Energy is seeking applications for new and innovative research that is expected to contribute significantly to meeting the NERI objectives in the technical areas specified in the following work elements. Because of the limited funds available for new awards, prospective applicants should exercise judgement in submitting only the most promising and important proposals that directly support the specified work elements. In formulating prospective projects, the current state of development in the areas to be investigated should be recognized, such as by citing references, to avoid repeating work already accomplished. In particular, work underway in on-going NERI projects should not be duplicated. Abstracts for current NERI projects may be found on the NERI web page:

http://neri.ne.doe.gov

Generation IV Nuclear Power Systems[1]

This program element includes the investigation and preliminary development of Generation IV reactor and power conversion system concepts that offer the prospect of improved performance and operation, design simplification, enhanced safety or reduced overall cost. Proposed projects may involve innovative reactor, systems or components designs, alternative power conversion cycles, advanced instrumentation and control, and other important design features and characteristics.

Applications for projects involving advanced reactors under this program element should address, among other items, the characteristics, principal attributes, feasibility, safety features, proliferation resistance, economic competitiveness, and additional research that may be required. These designs may be compact or modular designs suitable for transport to remote locations. Desirable features might include long-lived reactor cores that minimize, or avoid altogether, the need for refueling.

Competitive nuclear plant costs are necessary to restore nuclear power as a viable option to help meet our future electrical power demands. Therefore, this program element also will include projects intended to identify and evaluate alternative methods and technologies to reduce the costs of constructing future nuclear power plants. As an example, the use of modularization and/or prefabrication already has been demonstrated to shorten the construction schedule. As another example, increased automation and use of robots in the manufacture of equipment and in plant construction has the potential of significantly reducing costs, and in addition, making domestic manufacture of equipment more competitive.

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[1] Generation IV refers to the next generation of nuclear power systems, beyond the Advanced Light Water Reactors, which would be designed to address the long-term challenges to the expanded use of nuclear energy.

Improved Proliferation Resistance of Reactor Systems and Fuel Cycles

This program element concerns the investigation, and where applicable, preliminary development to establish feasibility and attributes of reactor systems, fuel systems, and/or alternative fuel cycles devised to improve the proliferation resistance of civilian nuclear power. Possible technology opportunities and subjects of investigation include alternative or modified reactor and fuel cycle concepts, material protection and control; and techniques that minimize generation of plutonium and waste by-products, restrict physical access to fuel materials while in the reactor, or increase the burnup of plutonium and other actinides in the fuel. The Department is particularly interested in proposals which include significant international collaboration.

Fundamental Science

This element includes research and development in fundamental science. The proposed research may be in the field of material science, chemical science, computational science, nuclear physics, or other applicable basic research fields. Candidate subjects of research may include the investigation of nuclear isomers that could prove beneficial in civilian applications.

The Department will particularly favor fundamental science proposals that directly support one or more of the preceding program elements. Proposals should identify the specific application and the expected benefits from successful completion of the work.

DESIGNATION OF FIELD(s) OF PROPOSED WORK

To facilitate selection of reviewers for the objective merit-peer review process, the Notices of Intent to Apply(Attachment A) and the applications should identify the nuclear engineering or fundamental science fields that most closely apply to the proposed research work. As shown in Attachment B, the fields that are pertinent to this Scope of Work include:

Nuclear engineering fields	- Reactors, reactor systems, components, structures, and reactor and power conversion cycles/concepts
	- Instrumentation and control
	- Reactor fuel systems to Improve proliferation resistance
Fundamental science	- Materials science
	- Fundamental chemistry
	- Computational and engineering science
	- Nuclear physics

The requested identification of applicable fields of work is not intended to constrain or otherwise influence the proposed work in any way. These designations are used to obtain the appropriate peer reviewer qualifications for the individual applications.

COLLABORATIVE FIELD WORK PROPOSALS

Collaboration between science and engineering research is encouraged. U.S. universities, DOE national laboratories, private industry and R&D and non-profit organizations are encouraged to submit collaborative field work proposals. Under this Program Announcement, collaborative field work proposals should identify the national laboratory as the lead organization, and should identify the work scope responsibilities and cost for each participating organization. The lead DOE national laboratory should submit a single field work proposal which integrates the portion of the overall project work scope assigned to each participant.

For successful field work proposals, the DOE national laboratory will fund other non-federal participants by a subcontract arrangement. The DOE national laboratory will be funded directly by DOE. The private sector or academic organizations must include a Face Page and Budget Pages for their portions of the project in the field work proposal. Separate Budget Pages must be included for the DOE national laboratory portions. A face page should be provided for the complete package, showing the total cost and individual collaborator costs for each year of the project. All costs should be specified for each year on an elapsed time basis, and not a fiscal year basis. The collaborative field work proposal must be submitted as one package.

Collaboration with international organizations is acceptable provided all DOE and other domestic funding is used for work performed in the U.S. Such collaborative arrangements are subject to approval by DOE and must comply with any Federal restrictions on foreign participation, and with any current DOE memoranda of understanding or other general agreements between DOE and the participating foreign entity.

FORMAT AND INFORMATION TO BE INCLUDED IN THE FIELD WORK PROPOSAL
(Reference DOE Order 5700.7C,
"Http://www.explorer.doe.gov:1776/htmls/regs/doe/seriestable.html"

The field work proposal(FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE operations office. Additional information also is required to allow for scientific/technical merit review.

Field work proposals should provide the following information. All budgets should be expressed in U.S. dollars, specified for each year of the project on an elapsed time basis, and not a fiscal year basis. The proposals should clearly present the objectives, work scope, including tasks to be performed, key milestones for each year, schedule, costs, and the importance/significance of the proposed project. Where collaborative efforts are proposed, the individual responsibilities of participating organizations should be identified. As a minimum, the following information should be included:

- Standard face page *(DOE Form 424)*
- Table of Contents
- Project Abstract and identification of the field of R&D of the proposed project (see Attachment B) (1 +page)
- Project Description - narrative description of proposed project, including objective(s), background, R&D plan, preliminary studies, and the importance of proposed project; also including itemized work plan showing individual tasks and responsible organizations (no more than 20 pages; multi-investigator collaborative projects may use up to 40 pages)
- Project schedule and milestones, including key milestones at the end of each budget year(12 month elapsed time, and not fiscal year basis)
- Collaborative R&D (if applicable) - description of the collaborative arrangements defining responsibilities and tasks assigned to each participating organization (up to 2 pages).
- Organization & Qualifications - identification of the project organization, and qualifications and responsibilities of the participating organizations. Biographical sketches of project manager/principal investigator and other key project personnel (no more than 2 pages each).
- Facilities & Resources - information on the experience of the applicant organization and the adequacy of required facilities and resources (no more than 3 pages).
- Budget for each participating organization for each year and for total project period (using DOE F.4620.1); total budget for each year and total project period; all annual budgets should be based on 12 months elapsed time and not on a fiscal year basis.
- Additional information the applicant deems relevant may be included, subject to the page limitation.

In addition to providing an original and seven copies of each field work proposal, proposers are required to also provide a 3.5-inch write protected diskette containing the field work proposal in electronic format. The label on the diskette must clearly identify the institution, principal investigator, title of field work proposal, and the computer system and program used to prepare the document. Unsuccessful field work proposals will not be returned to the proposer.

FIELD WORK PROPOSAL EVALUATION:

All valid field work proposals will be evaluated in accordance with the requirements of Title 10 Code of Federal Regulations, Part 600.13

- DOE will perform an initial review for conformance with the technical and administrative requirements stated in this Program Announcement, for funding availability, and for relevance to NERI program objectives.

- For those field work proposals that successfully complete the initial review, an objective merit-peer review will be performed to evaluate technical and/or scientific merit, and cost aspects of the proposals, exclusive of NE programmatic and policy factors. The objective merit review will be in accordance with the evaluation criteria stated below. For this purpose, a group comprised of three or more professionally and technically qualified persons will be selected in such a manner as to assure the highest degree of independence and objectivity. Following this review, panels comprised of these reviewers will be convened for the peer review. The reviewers may include any mix of federal and non-federal experts, except those persons involved in approving/disapproving the field work proposals. Reviewers must comply with the requirements for avoiding conflict of interest as stated in 10 CFR 600.14.

- Following the objective merit-peer review, programmatic and relevance reviews will be performed by DOE for those field work proposals judged to be of the highest merit. The field work proposals will be evaluated with respect to NE programmatic and policy factors, including relevance of the proposed work to NERI program objectives, availability of funds, and the balance among program elements to be supported.

The following evaluation criteria apply to the objective merit review:

- Technical quality of the field work proposal:
  - - Contribution to the state of knowledge in the scientific/technology fields;
  -- Importance of the proposed work in meeting program objectives;
  -- Completeness and clarity of the technical proposal
  -- Appropriateness/adequacy of the proposed methodology or approach;

- Extent to which proposed work is new, unique or innovative;

- Reasonableness of project cost and schedule, including allocations among multiple participating organizations where applicable;

- Capabilities and qualifications of principal investigator/project manager and key personnel, adequacy of resources and facilities applied by participating organizations.

INTELLECTUAL PROPERTY RIGHTS

With respect to intellectual property, the patent and data provisions set forth in the national laboratories M&O contract shall be used.

STATUATORY AND REGULATORY AUTHORITY

The Nuclear Energy Research Initiative is being conducted under the authority of the Energy and Water Development Appropriations Act of 2000, HR 2605, and 106-336; the Catalog of Federal Domestic Assistance (CFDA) number 81.092; and the applicable DOE Financial Assistance Regulations in 10 CFR Part 600. The regulations and guidance documents can be accessed on the DOE Financial Assistance Home Page at "http://www.pr.doe.gov/fahome.html".

PROGRAM ANNOUNCEMENT QUESTIONS & ANSWERS

DOE does not intend to hold a preproposal conference. You may submit your written questions via e-mail to denise.berry@oak.doe.gov by November 29, 1999. Responses to questions will be placed on the Oakland Operations Office Website at "http://www.oak.doe.gov/financial/sol_page.html".

INFORMATION

Information about the development, submission of field work proposals, eligibility, limitation, the selection process, and other policies and procedures may be found on “http://www.oak.doe.gov/financial/sol_page.html”.

FOR FURTHER INFORMATION CONTACT:

Denise Berry, Contract Specialist
U.S. Department of Energy
1301 Clay Street, 700N
Oakland, California 94612-5208
(510) 637-1873
(510) 637-2025 (FAX)

This Program Announcement will be published in the Federal Register on or about November 10, 1999.

ATTACHMENT A

NOTICE OF INTENT TO APPLY

FAX: (510) 637-2025

TO: Denise Berry, Contract Specialist

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Name of Lead Organization/Principal Investigator

Name of Collaborating Organization(s)

intend to submit an application under Program Announcement No. _____

Title: _____

Scope of Work Element: _____

Engineering or fundamental science field , F-___ (from Attachment B)

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ATTACHMENT B

APPLICABLE FIELDS OF WORK

(To designate applicable fields of nuclear engineering and fundamental science to facilitate evaluation of applications)

Nuclear Engineering:

F-1	Reactors, reactor systems, components, structures, and reactor - power conversion cycles/concepts
F-2	Instrumentation and control systems
F-3	Reactor-fuel systems to improve proliferation resistance
F-5-1	Materials science
F-5-2	Fundamental chemistry
F-5-3	Computational and engineering science
F-5-4	Nuclear physics